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Relationship Between the ACE Gene Polymorphism and Angiographic Coronary Artery Disease

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Abstract

The relationship between angiotensin-converting enzyme (ACE) gene polymorphism and several cardiovascular diseases such as myocardial infarction (MI) and its prognosis is controversial. Clinical evolution, ACE levels, and ACE polymorphism were studied. A control group of 20 valvular patients with normal angiography was established. Angiographic study was done in 50 patients. Our studies reveal that CAD patients with DD genotype of 287 bp ACE gene which is located in the 6th chromosome are under great risk than the DI genotype and II genotype patients of virudhunagar, it is as recent with global report. The DD genotype was more frequent in the CAD patient compare to the control the relative risk for DD genotype was high.

Key words: ACE gene insertion, deletion polymorphism, ACE activity, blood pressure, coronary artery disease.

Introduction

The conversion of angiotensin I into angiotensin II. Angiotensin II has a variety of function but for simply say that directly increases blood pressure by constricting arteries and indirectly raises blood volume, coronary artery disease (CAD) is a multifactorial disease caused by various genetic and environmental factors involved in the atherosclerosis and thrombin complication. Inflammations play a key role in susceptibility to coronary atherosclerosis. The genomic DNA was amplified by PCR. The flanking primer pairs yield in 490bp and 190bp amplified products corresponding to the I and D allele. The PCR product detected by 1% agarose. Mixtyping of ID as D may occur due to preferential amplification of the D allele and in efficiency in the amplification of I allele.

MATERIALS AND METHODS

Study population:

Our case-control study population consisted of 50 CAD patients with ages ranging from (20 -50). Angiotensin converting enzyme was identified in patients who underwent coronary angiography between Jan 2006-April 2006. With use of a standardized questionnaire, the medical history of patients and medications used at the time of the coronary angiography were carefully recorded. Control groups consisted of subjects free from CAD,

based on physical examination, history of cardiovascular disease and electrocardiogram. The presence of hypertension, diabetes mellitus, and smoking status were exclusion criteria from the control group.

Determination of ACE D/D polymorphism:

Genomic DNA was extracted from leucocytes by standard methods from peripheral blood collected in tubes containing EDTA . Angiotensin converting enzyme (ACE) genotypes were classified as II, ID, DD. Angiotensin converting enzyme gene D/D polymorphism was determined by polymerase chain reaction (PCR) using a primer pair flanking the polymorphic region of intron 16 that produces either an amplified 287 bp (D allele) . The reactions were performed according to the method of Rigat et al. . The sense nucleotide primer was 5'-CTGGAGACCACTCCCATCCTTTCT-3' and the antisense primer was 5'-GATGTGGCCATCAATTCGTCAGAT-3'. Polymerase chain reactions were performed in 50 µl reaction volumes with 50 pmol each primer, 100 ng genomic DNA, 1.5 mmol/L of MgCl₂ , 50 mmol/L of KCl, 10 mmol/L of Tris-HCl (pH 8.3), 200 µmol/L for each dNTP, and 2.5 U Amplitaq DNA polymerase . Amplification was performed as follows: initial denaturation at 95°C for 2 min followed by 30 cycles of denaturation at 95°C for 1 min, annealing at 60 °C for 2 min, and extension at 72°C for 3 min. The PCR products were visualized by electrophoresis in a 2 % agarose gel with ethidium bromide and documented with a gel documentation system .

RESULTS AND DISCUSSION

The DD genotype was more frequent in the CAD patients and they are the more risk group than DI/II allele. The baseline characteristics of the study groups are presented .The age and gender distributions of patients with CAD and controls were not similar. To prevent affection of this bias on our study we selected control patients as free of coronary risk factors (smoking, hypertension, diabetes). But despite we minimize these bias, age and gender differences are remained to be the limitations of our study. Significant differences were noted between study groups in respect of total cholesterol, triglycerides and HDL-C levels. All of them were higher in the CAD group than in control group. Descriptive statistics of the coronary angiography study population are presented

Cardiovascular disease is the major cause of morbidity and mortality in virudhunagar district. It is well known that the etiology of this devastating disorder involves both genetic and environmental factors. Sequence variants of the components of the rennin angiotensin-aldosterone system and the kallikrein-kinin system are suggested to have significant influences on cardiovascular homeostasis. Thus, the ACE gene has been recognized as a top candidate gene for cardiovascular research. While a number of studies have implicated the role of the ACE polymorphism in cardiac disorders, such as myocardial infarction CAD, left ventricular hypertrophy and hypertension others have argued that it may be associated with increase in plasma ACE activity without being a risk factor for coronary heart disease . These inconsistent results may depend on the gender differences and ethnic traits of the individual populations reported significant association of ACE gene DD polymorphism and CAD . In this study, we analyzed the association between polymorphism in the ACE gene and CAD relation in individuals. The DD genotype was more frequent in the CAD patient compare to the control the relative risk for DD genotype was high.

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